

CLAIMS

1. A manufacturing method for microcapsules comprising the steps of:
preparing an emulsion which contains a polyelectrolyte solution as a disperse phase having a uniform diameter and a continuous phase;
demulsifying the emulsion; and
contacting the polyelectrolyte solution as a disperse phase with a polyelectrolyte solution having a reverse electric charge to the polyelectrolyte solution as a disperse phase or a polyvalent ion solution at the same time of the demulsifying step so as to form a gel layer made of a polyelectrolyte complex around fine particles of the polyelectrolyte solution as a disperse phase by a polyelectrolyte reaction.
2. The manufacturing method for microcapsules according to claim 1, wherein the emulsion is prepared by separately feeding the disperse phase and the continuous phase with a plate having penetrating holes, and applying greater pressure to the disperse phase than to the continuous phase so as to push the disperse phase into the continuous phase as microspheres.
3. The manufacturing method for microcapsules according to claim 1 or 2, wherein the emulsion is demulsified by adding the same material as the continuous phase or a soluble material to the continuous phase thereto so as to reduce the concentration of a surface-active agent.
4. The manufacturing method for microcapsules according to claim 1 or 2, wherein a surface-active agent is originally not added to the continuous phase such that an emulsion which easily is demulsified is prepared, and this emulsion is contacted with a polyelectrolyte solution having a reverse electric charge to the polyelectrolyte solution as a disperse phase or a polyvalent ion solution immediately.
5. The manufacturing method for microcapsules according to any one of claims

1-4, wherein the disperse phase is selected from a group of an alginic acid, carboxymethyl cellulose, pectin, carrageenan, sulfate cellulose, and chondroitin sulfuric acid; the polyelectrolyte to be reacted with the disperse phase is selected from a group of a polyamino acid, polymer containing a primary amine group, a secondary amine group, a tertiary amine group, or pyridinyl nitrogen, and aminated polysaccharide; and the polyvalent ion to be reacted with the disperse phase is selected from a group of Ca^{2+} , Ba^{2+} , Pb^{2+} , Cu^{2+} , Cd^{2+} , Sr^{2+} , Co^{2+} , Ni^{2+} , Zn^{2+} and Mn^{2+} .

6. The manufacturing method for microcapsules according to any one of claims 1-5, wherein a cell which generates a desired material is added to the polyelectrolyte solution as a disperse phase in advance.

7. The manufacturing method for microcapsules according to any one of claims 1-6, wherein the diameter of the disperse phase is within the range of 50 - 300 μm .

8. A method for treating a human body, wherein the microcapsule manufactured by the method according to any one of claims 1-7 is injected into parts of a human body by an injector, a catheter or an operation.